

REMARKS

Reconsideration is respectfully requested for the following reasons.

The undersigned thanks Examiner Cheung for taking the time to discuss the subject application and the rejections presented over the telephone on June 24, 2008. During the interview Examiner Cheung and the undersigned discussed the claims, in particular, claims 1 and 69, and the rejections. No agreements were reached.

In paragraph 4, Claims 1, 2, 10-12, 24-41, 46-55, 58 and 61-76 stand rejected under 35 USC 103(a) as obvious over Gutweiler (US 5,573,842) in view of Dauvergne (FR 2,401,941 Abstract), and Shohi (EP 1036775), further in view of Degeilh (US 4,696,971) and then in view of Masao (JP08-337446).

In paragraph 5, Claims 59-60 stand rejected under 35 USC 103(a) as obvious over Gutweiler (US 5,573,842) in view of Dauvergne (FR 2,401,941 Abstract), in view of Shohi (EP 1036775), in view of Degeilh (US 4,696,971), and further in view of Keppler (US 4,433,108) and then in view of Masao (JP08-337446).

Claims 1, 69, 77 and 80 are typical of the claims.

Claim 1 is directed to a process for preparing a low color, polyvinyl butyral (PVB) sheet for use in the manufacture of glass laminates. The process comprises a number of steps. The first step (I) is admixing polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and sodium *diocetyl sulfosuccinate* ("**DOS**" or "**DOSS**"). The second step (II) is stabilizing the mixture obtained in step (I) by (a) **raising the pH of the mixture to at least pH 10**, (b) isolating the PVB resin composition by draining the liquid, and (c) washing the PVB resin composition with neutral pH water. The third step (III) is plasticizing the PVB resin composition with from about 30 to about 50 pph of plasticizer selected from the group consisting of triethylene glycol di(2-ethylhexanoate), tetraethylene glycol diheptanoate, dibutyl sebacate, and mixtures thereof, based on the dry weight of the resin. The fourth step (IV) is mixing (a) a PVB bleaching compound selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates, and, optionally, (b) an antioxidant and a UV light stabilizer with the polyvinyl butyral resin composition. The fifth step (V) is extruding the PVB resin composition at a temperature of from about 175°C to about 225°C to obtain a PVB sheet having a glass transition temperature (T_g) of greater than about 32°C and a YID of less than about 12.

Claim 69 is directed to the process of claim 1 further comprising laminating the PVB sheet to glass.

Claim 77 is directed to the process of claim 1 further comprising forming a windshield by laminating the polyvinyl butyral sheet to glass.

Claim 80 is directed to the process of claim 1 further comprising forming a glass laminate for use in a home or other building.

The general gist of the Actions can be seen from the Advisory Action dated January 8, 2007, which states:

“Applicants continue to argue that Degeilh teaches away from the claimed invention which requires a pH of at least 10. However, applicants fail to recognize that Dauvergne has already taught a process for preparing PVB comprising adding PVA, acid catalyst, and an emulsifier (i.e., surfactant) into a reactor with stirring, introducing butyraldehyde gradually, then, after adjusting pH to 9-11, separating the resultant PVB from the mixture (Abstract). Therefore, the rejection set forth does not require the second reference Degeilh to possess the claimed pH. Regarding whether the teachings of Degeilh can be combined with the teachings of Dauvergne because Degeilh teaches a process that [requires] a pH of no more than 5, applicants fail to recognize that the DOS teachings in Degeilh is combinable with the teachings of Dauvergne because the pH and DOS teachings of Degeilh are independent variables in the process of Degeilh. Therefore, the examiner has a reasonable basis that the pH condition of Degeilh does not prevent (or teach [away]) the DOS teachings to be incorporated in to the teachings of Dauvergne.”

The April 16, 2008 Action contains similar statements in the paragraph bridging pages 10-11:

“Regarding applicants’ argument that Degeilh teaches away from the instantly claimed invention because Degeilh teaches a process involving a step of neutralizing to a pH of no more than 5. However the examiner disagrees because applicants must recognize that Degeilh only teaches away of pH of no more than 5 when the product is used in applications where the ability to adhere to glass is critical. Further, applicants must recognize that Degeilh (col 1, line 68 to col. 2, line 2) clearly discloses typically, this after-treatment is carried out in an aqueous medium under basic conditions, namely, at a pH between 9 and 11, which fully embracing the pH of at least 10 as claimed.”

Upon further review, applicants note that Degeilh columns 1-2 describe that Dauvergne (FR 2,401,941) teaches use of sodium alkylsulfonate or sodium alkylaryl-sulfonate as emulsifiers, and to the extent that applicants previously made any arguments that are inconsistent with this, those arguments are expressly withdrawn and applicants and the undersigned apologize to the Examiner.

Applicants traverse the rejection for the reason that Degeilh leads away from the claimed invention by teaching away from use of a DOSS and carrying out step (II) of the independent claims by “raising the pH of the mixture to at least pH 10”, and since none of the cited documents would lead the person of ordinary skill in the art to modify the process of

Degeilh to arrive at the claimed invention. In addition, applicants submit that the claimed invention provides an unexpected result.

MPEP 2141.02 VI. and 2145 D. discuss the situation where a cited document or combination of cited documents teach away from an invention. They are reproduced below for the Examiner's convenience:

2141.02 Differences Between Prior Art and Claimed Invention

VI. PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.).

However, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed..." *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). >See also MPEP § 2123.<

2145 Consideration of Applicant's Rebuttal Arguments

D. References Teach Away from the Invention or Render Prior Art Unsatisfactory for Intended Purpose

In addition to the material below, see MPEP § 2141.02 (prior art must be considered in its entirety, including disclosures that teach away from the claims) and MPEP § 2143.01 (proposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference).

1. The Nature of the Teaching Is Highly Relevant

A prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness; however, "the nature of the teaching is highly relevant and must be weighed in substance. A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) (Claims were directed to an epoxy resin

based printed circuit material. A prior art reference disclosed a polyester-imide resin based printed circuit material, and taught that although epoxy resin based materials have acceptable stability and some degree of flexibility, they are inferior to polyester-imide resin based materials. The court held the claims would have been obvious over the prior art because the reference taught epoxy resin based material was useful for applicant's purpose, applicant did not distinguish the claimed epoxy from the prior art epoxy, and applicant asserted no discovery beyond what was known to the art.).

Furthermore, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed..." *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

2. References Cannot Be Combined Where Reference Teaches Away from Their Combination

It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (The claimed catalyst which contained both iron and an alkali metal was not suggested by the combination of a reference which taught the interchangeability of antimony and alkali metal with the same beneficial result, combined with a reference expressly excluding antimony from, and adding iron to, a catalyst.).

In the claimed invention a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and DOSS obtained in step (I) is stabilized by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water.

First, applicants point out that Degeilh expressly teaches away from the claimed invention. In addition, applicants submit that Degeilh and Dauvergne (FR 2,401,941) can not be combined as in the rejection since the two documents expressly teach away from such a combination.

Degeilh is focused on improving the Dauvergne process and indicates that the Degeilh lower pH reduces costs and provides other advantages. Degeilh expressly teaches away from using DOSS in a process involving stabilizing a mixture of the type obtained in step (I) by (a) raising the pH of the mixture to at least pH 10, (b) isolating the resin by draining the liquid, and (c) washing the resin with neutral pH water. Degeilh teaches that the process should be carried out with DOSS and neutralizing to pH of no more than 5, not using dodecylbenzene sulphonate in combination with a higher pH as in Dauvergne. For example, at column 2, lines 15-20, Degeilh teaches that it is improving the process of Dauvergne by using the combination of discontinuing neutralization as soon as a pH of 5 is reached and by use of DOSS. At column, 2, lines 33-40, Degeilh states that "the use of DOS effective as an emulsifier substantially decreases the 'curing time' of the polyvinyl butyral after neutralization to a range of 5 to 10 minutes." This can also be seen from the Degeilh paragraph beginning at column 3, line 15, which states:

“A particularly important requirement for improving the properties of the polyvinyl butyral according to the invention is the presence of DOS effective as an emulsifier. DOS advantageously facilitates the after-treatment of the polyvinyl butyral to separate the product. Unlike conventional emulsifiers which are removed from the polymer by the addition of a base, DOS is completely and inexpensively removed from the polymer by a thorough washing with water. As a result, a product is inexpensively obtained which has superior adhesiveness to contiguous glass materials.”

From the above quote, it can be seen that the DOSS is used in Degeilh to facility the after-treatment of the polyvinyl butyral to separate the product in an environment wherein the pH is not raised by adding a base. Thus, Degeilh is teaching away from the claimed features of step (II) of the independent process claims, which is claimed in claim 1 as follows:

“(II) stabilizing the mixture obtained in step (I) by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water;”

Moreover, the Patent Office can not properly take the position that the Dauvergne and Degeilh processes can be combined in some fashion to arrive at the claimed invention since Degeilh discusses the earlier teachings of Dauvergne concerning using a higher pH when other emulsifiers are used and expressly teaches the need to use DOS and discontinue the neutralization process as soon as a Ph of approximately 5 is reached,. (See, e.g., column 2, lines 15-23.)

Second, applicants wish to point out that the rejection is incorrectly pointing to Degeilh column 1, lines 68 to column 2, line 2, in support of teaching use of a pH between 9 and 11. Degeilh expressly teaches away from using high pH. Degeilh teaches a process involving a step of neutralizing to a pH of no more than 5. The portion of Degeilh referred to in the Action is discussing a prior process described in Dauvergne (FR 2,401,941) that Degeilh considers to be inadequate, and that prior process does not involve the use of DOS. Degeilh is focused on improving the Dauvergne, and the claimed invention is an improvement over both processes. Degeilh states that when DOS is used the neutralization must be discontinued when a pH of approximately 5 is reached.

Third, applicants submit that the Patent Office improperly takes the position that the claims should be restricted to applications where adhesion is required. The first reason is that such an amendment is not needed to establish patentability. The second reason is that Degeilh discusses other advantages of the Degeilh process and these would also be considered advantages that apply to any use of PVB. For instance, at column 2, lines 24-26 discuss the fact that DOSS is completely and inexpensively removed in the Degeilh process, whereas the paragraph bridging columns 1-2 discusses the problems encountered with the Dauvergne

(FR 2,401,941) process, high pH, and the use of soda or other substitutes chemicals, and states that they significantly increase the cost and prolong the process. Applicants submit a third reason is that the phrase “for use in the manufacture of glass laminates” should be read into the claims since it means that the polyvinyl butyral sheet produced by the process adheres suitably to glass for making a glass laminate, such as, for example: windshields for automobiles. Here, applicants point direct the Examiner’s attention to the Abstract and to the paragraph beginning on page 1, line 9, and to the DuPont website that describe the science and history of laminated safety glass that were previously submitted

<http://www.dupont.com/safetyglass/en/science/index.html>,

<http://www.dupont.com/safetyglass/en/science/history/index.html> and

<http://www.dupont.com/safetyglass/en/science/technology/index.html>, and the brochure

entitled “DuPont™ Laminated Glass Interlayers” which was also previously submitted, which describe the fact that the sheets of the invention are interlayer sheets that are used to form glass laminates, such as windshields, wherein the PVB sheets adhere to glass.

Further, applicants point out that they have presented claims such as claims 69, 77 and 80 which focus on continuing the process through making glass laminates, windshields and buildings, respectively, so that they cover uses in which glass is adhered to the PVB.

Lastly, applicants submit that the claimed invention provides unexpected results. Submitted herewith is a Declaration Under 37 CFR1.132 executed by Donald L. Rymer, one of the co-inventors and an employee of the assignee, E. I. du Pont de Nemours and Company (DuPont).

According to the Declaration, Mr. Rymer observed two PVB laminates made from PVB produced by DuPont using DOSS and different pHs. The first one was made with a flake neutralized at a pH of > 10 as claimed. The second one is a comparative PVB laminate where the flake used to produce the material was neutralized at a pH of less than 9. Both were made using dialkyl sulfosuccinate (DOSS) and were made on the same equipment using relatively the same parameters.

When each sample was viewed by Mr. Rymer, his observation was that the invention sample was very clear. The comparative sample showed defects. These differences were magnified when viewed under high intensity light, which is common windshield test used in the industry to observe clarity.

The samples were also evaluated under a microscope using UV light and counting and sizing device. Attached to the Declaration is a graph showing the gel counts. The lighter line (blue) to the left, when present, represents the invention and the darker line (red) (to the right) represents the comparative sample. The comparative sample had larger amount and larger size gel particles than the sample representing the invention. Higher quantities of and larger sized gel particles are unacceptable because they are easier to see and scatter light.

Given the above, it is Mr. Rymer's opinion that the invention, which involves use of DOSS and neutralizing to pH or at least 10, provides better clarity laminates than laminates prepared from PVB sheet made using a process involving DOSS and a neutralization step at lower pHs. He states that the better clarity obtained with the claimed invention would not be expected based upon the Degeilh and the other documents cited in the rejections.

In summary, in the claimed invention a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and DOSS obtained in step (I) is stabilized by (a) raising the pH of the mixture to at least pH 10, (b) isolating the PVB resin composition by draining the liquid, and (c) washing the PVB resin composition with neutral pH water. Applicants submit that the Degeilh leads away from the claimed invention by teaching away from a process comprising the two key steps of:

- use of DOS; in combination with
- the stabilizing step (II) involving (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water,

and since none of the cited documents would lead the person of ordinary skill in the art to modify the process of Degeilh to arrive at the claimed invention. In addition, applicants submit that the invention provides results that would not be expected based on the cited documents. For these reasons, applicants respectfully request that the rejections under 35 USC 103 be withdrawn.

Applicants have amended the claims to recite that the first step involves use of sodium dialkyl sulfosuccinate as previously recited in claims 10, 27 and 68, and have cancelled and amended a number of claims to conform the dependent claims to these amendments.

Claims 77-82 are added as supported at page 1, lines 9-15 and the Abstract.

Applicants cancelled nine claims and added six claims, so no fee should be due for additional claims.

Entry and consideration are respectfully requested.

In view of the foregoing, allowance of the above-referenced application is respectfully requested. Should any matters remain, the Examiner is invited to telephone the undersigned at the below-listed direct dial telephone number in order to expedite prosecution.

Respectfully submitted,

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